

To our customers,

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# M38C89T-ADF

User's Manual

Temporary Target Board for M38C89RLFS

\* IC51-1444-1354-18 is a product of Yamaichi Electronics Co., Ltd.

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# Contents

1. Things to Check When Unpacking .....	4
2. Outline .....	4
3. Specifications .....	5
4. Setting Up .....	6
4.1 Connecting to the Emulator .....	6
4.2 Mounting the M38C89MF-xxxFP/M38C89EFFP .....	8
5. Oscillator Circuit .....	9
5.1 Main Clock Generator Circuit .....	9
5.2 Sub Clock Generator Circuit .....	9
5.3 How to Use the RC Oscillator Circuit .....	10
6. Reset Circuit .....	10
7. LCD Bias Circuit .....	10
8. Pin Layout .....	11

# 1. Things to Check When Unpacking

The M38C89T-ADF package consists of the following products. When unpacking your package, check to see that all of these components are included.

Table 1.1 Contents of the M38C89T-ADF package

Item	Quantity
M38C89T-ADF temporary target board	1
M38C89T-ADF User's Manual (this manual)	1

\* If you find any item missing or faulty, or any suggestion, contact your local distributor.

## 2. Outline

The M38C89T-ADF is a temporary target board used to develop software with a PC4701 emulator system. It supplies to the M38C89RLFS MCU the minimum required signals needed to operate the emulator MCU, including power supply voltage, clock signals and reset signals. Use it when the target system is not ready. A block diagram of the M38C89T-ADF is shown in Figure 2.1.

IC1 has a pattern for mounting a socket for an M38C89MF-xxxFP/M38C89EFFP. This makes it possible for this board to debug programs using an emulator MCU in IC2 or execute programs using an M38C89MF-xxxFP/M38C89EFFP. A socket for M38C89MF-xxxFP/M38C89EFFP and parts for an LCD bias circuitry are not mounted. Mount them as necessary.

Expansion boards can be installed in the through-holes of connectors J2, J3 and J4. Spacing between connectors is given in Figure 2.1. Keep connector location in mind when making expansion boards. Use 2.54-mm-pitch connectors. For pin array, see Table 8.1.

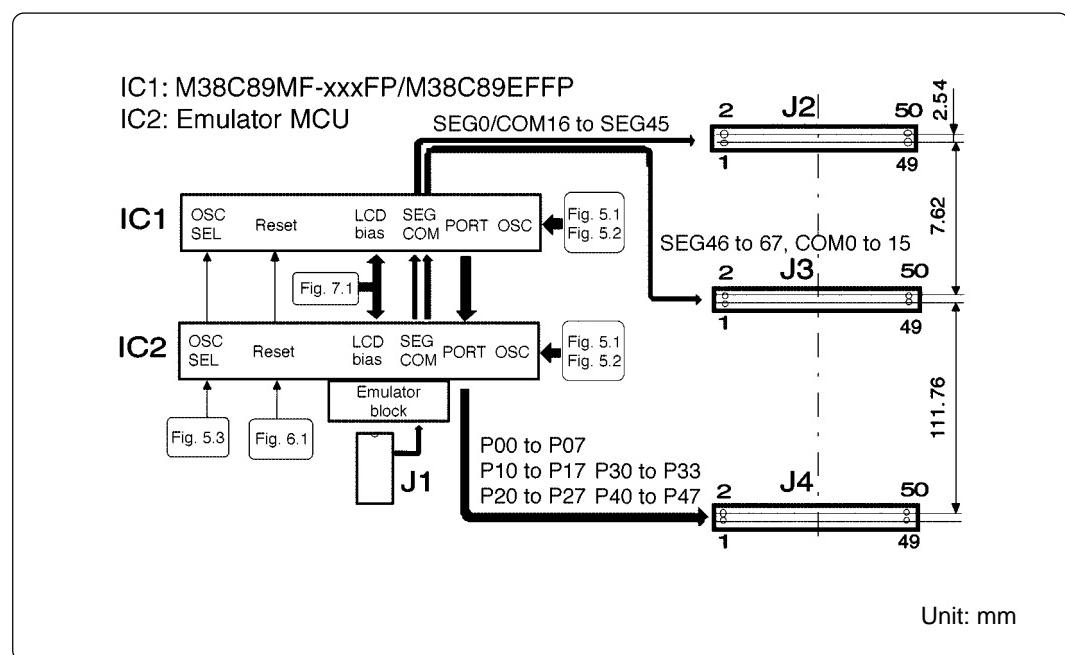


Figure 2.1 Block diagram and pin layout

### 3. Specifications

Table 3.1 lists specifications of the M38C89T-ADF.

*Table 3.1 Specifications of the M38C89T-ADF*

Applicable MCUs		IC1: 38C8 Group (M38C89MF-xxxFP/M38C89EFFP) IC2: M38C89RLFS (Emulator MCU)
Clock		Main clock: 4.0MHz oscillator mounted (for IC2 only) (RC oscillation: approx. 2 MHz <sup>*1</sup> ) Sub clock: 32.768 kHz mounted (for IC2 only)
VccM		Power supply for IC1 and IC2 (supplied separately <sup>*2</sup> )
VccU		Power supply for universal part (supplied separately <sup>*2</sup> )
Vss		Common signal ground (supplied separately <sup>*2</sup> )
RESET		<ul style="list-style-type: none"><li>• Reset circuit mounted (power-on reset and reset switch)</li><li>• Connects the reset output of an emulation pod</li></ul>
External dimensions	Width	220 mm
	Depth	160 mm
Others		<ul style="list-style-type: none"><li>• Universal part prepared</li><li>• Through hole for 2.54-mm-pitch connector prepared</li><li>• RC oscillator circuit can be selected as a main clock oscillator<sup>*3</sup></li><li>• Bias circuit for LCD prepared (parts not mounted)</li></ul>

\*1 RC oscillation frequency will vary according to MCU power supply voltage, resistance, temperature, etc. That listed herein was measured for reference purposes only and is not guaranteed.

\*2 Power cannot be supplied from the emulation pod for PC4701 (e.g. M38000TL2-FPD). A separate power supply is needed.

\*3 Jumpers must be changed to enable RC oscillation. For more information, see "5.3 How to Use the RC Oscillator Circuit" (page 10).

# 4. Setting Up

This chapter describes how to set up the M38C89T-ADF.

With this product, the debugging with an emulator MCU and M38C89MF-xxxFP/M38C89EFFP is possible. Use the M38C89T-ADF mounting one of these MCUs.

To use an emulator MCU:

Read "4.1 Connecting to the Emulator" (this page)

To use the M38C89MF-xxxFP/M38C89EFFP:

Read "4.2 Mounting the M38C89MF-xxxFP/M38C89EFFP" (page 8)

## ⚠ CAUTION

### Note on Setting Up:

- Always shut OFF power before connecting the M38C89T-ADF.
- Do not mount the IC1 and IC2 at the same time. Mount either of them only.

## 4.1 Connecting to the Emulator

### (1) Mounting the emulator MCU

Mount the emulator MCU in the IC2 socket on the M38C89T-ADF.

Raise the socket's clamp and insert the emulator MCU flush against the socket's left and bottom sides, placing the "•" marking on the emulator MCU at the right bottom corner. Then, lower the clamp to lock the emulator MCU in place.

If your emulator MCU does not have the "•" marking on it, use one pin (back of the MCU) for positioning as shown below.

MCUs have 20 x 20 pins to the socket's 21 x 21 holes. Since there are more socket holes to MCU pins, insert the MCU flush against the socket's left and bottom sides. The socket is taped to prevent improper MCU mounting. Do not peel off the tape.

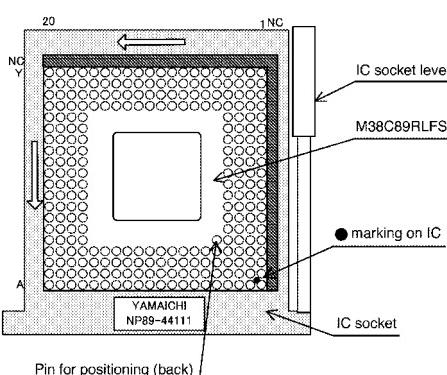


Figure 4.1 Mounting the emulator MCU on the M38C89T-ADF

### (2) Connecting the emulation probe

Insert the connector on the tip of the emulation pod probe to the J1 of this board. For the direction, see Figure 4.2.

### (3) Setting the emulation pod (M38000TL2-FPD)

As the applicable emulator MCU (M38C89RLFS) for this product is RLFS type, set the switch on the side of the emulation pod to RLSS/RLFS side.

#### (4) Connecting the control signal lines

Connect the three lines of the emulation pod to the test pins.

- VCC cable (yellow) ..... VccM (test pin with a yellow bead)
- GND cable (black) ..... GND (test pin with a black bead)
- Reset cable (white) ..... RESET (test pin with a white bead)

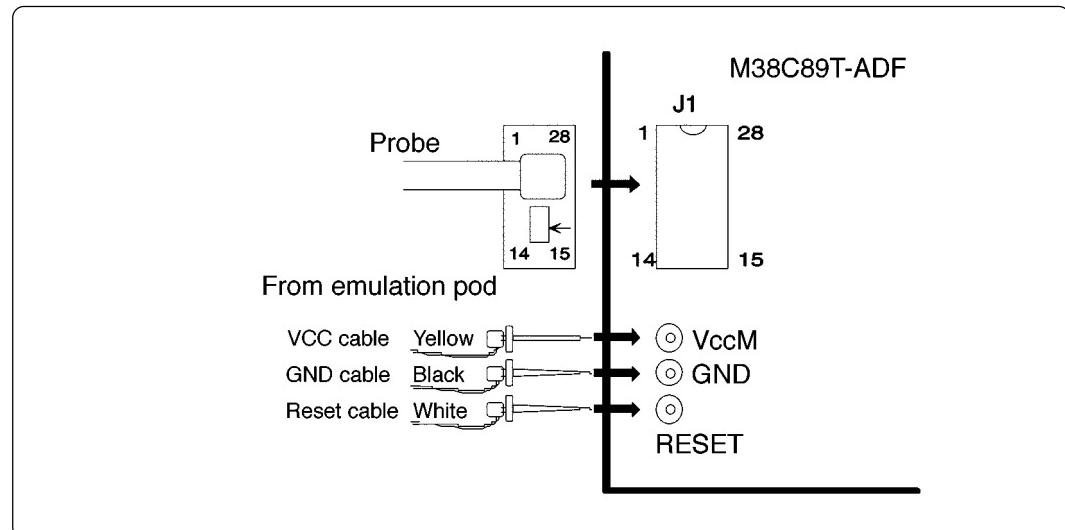


Figure 4.2 Connecting the M38C89T-ADF

#### (5) Setting jumpers

Set the jumpers (JP3 to JP7) according to your application. Table 4.1 describes the functions of the jumpers for the emulator MCU (IC2).

Table 4.1 Functions of the jumpers (JP) of the M38C89T-ADF (1/2)

Name	Applicable signal	Function	Factory-setting
JP3	Vss (NC)-VLIN	Remain Open.	Open
JP4	OSCSEL	Switches the OSCSEL pin • Short-circuit: OSCSEL = "L" Selects the oscillation by ceramic resonator. • Open: OSCSEL = "H" Selects the RC oscillation.	Short-circuit
JP5	XIN	R10 side: RC oscillation, X2 side: Oscillation by X2	X2 side
JP6	XOUT		
JP7	VccM-VccU	For short-circuit of VccM-VccU	Open

#### (6) Connecting a power supply

Connect a power supply (not included) to the board's VccM power supply test (large) pin and GND. Power is supplied to Vcc of IC1 and IC2.

To use the VccU universal power supply, connect a power supply (not included) to the VccU power supply test pin.

VccM and VccU are not connected on the board. They can be connected by short-circuiting jumper JP7.

## 4.2 Mounting the M38C89MF-xxxFP/M38C89EFFP

### (1) Mounting parts

Mount the socket for IC1 and the oscillator circuit part. Table 4.2 lists the applicable parts for this board.

*Table 4.2 Socket for the M38C89MF-xxxFP/M38C89EFFP and applicable oscillator circuit*

No.	Part No.	Type name	Manufacturer	Remarks
1	IC1	IC51-1444-1354-18	Yamaichi Electronics Co., Ltd.	144-pin socket
2	X1	CST4.00MGW040	Murata Manufacturing Co., Ltd.	Built-in capacitor type, 4 MHz
3	XC1	SP-T2B 32.768 kHz	Seiko Instruments Inc.	On-board type
4	C5, C6	RPE132CH100J50	Murata Manufacturing Co., Ltd.	10 pF
5	R2	-	-	0 Ω, short-circuit
6	R3	RD16S 6.8MΩ	KOA	6.8 MΩ

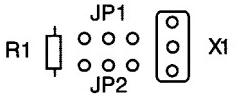
### (2) Mounting the M38C89MF-xxxFP/M38C89EFFP

To mount the M38C89MF-xxxFP/M38C89EFFP, remove the emulator MCU and install the M38C89MF-xxxFP/M38C89EFFP in the IC1 socket. Align pin No. 1 with the printed mark.

### (3) Setting jumpers (JP)

Set the jumpers (J1 to J4 and J7) according to your applications. Table 4.3 describes the functions of the jumpers.

*Table 4.3 Functions of the jumpers (JP) of the M38C89T-ADF (2/2)*

Name	Applicable signal	Function	Factory-setting
JP1	XIN	R1 side: RC oscillation, X1 side: Oscillation by X1 	Open
JP2	XOUT		
JP3	Vss (NC)-VLIN	Remain Open.	Open
JP4	OSCSEL	Switches the OSCSEL pin • Short-circuit: OSCSEL = "L" Selects the oscillation by ceramic resonator • Open: OSCSEL = "H" Selects the RC oscillation	Short-circuit
JP7	VccM-VccU	For short-circuit of VccM-VccU	Open

### (4) Connecting a power supply

Connect a power supply (not included) to the board's VccM power supply test (large) pin and GND. Power is supplied to Vcc of IC1 and IC2.

To use the VccU universal power supply, connect a power supply (not included) to the VccU power supply test pin.

VccM and VccU are not connected on the board. They can be connected by short-circuiting jumper JP7.

# 5. Oscillator Circuit

## 5.1 Main Clock Generator Circuit

The main clock of 4.0 MHz is mounted (X2 only). Figure 5.1 shows the main clock generator circuit.

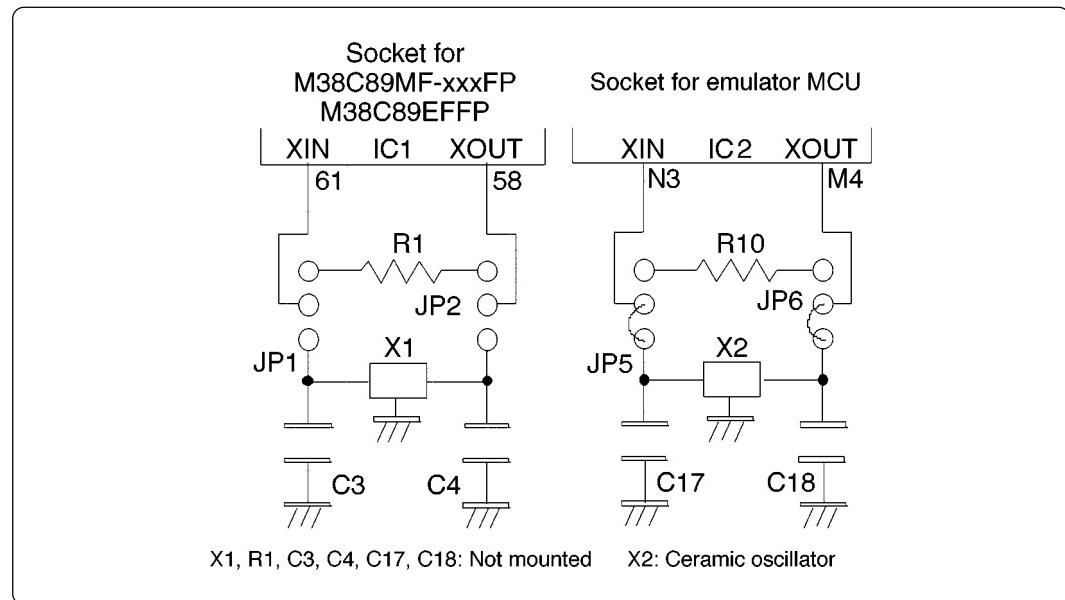


Figure 5.1 Main clock generator circuit

## 5.2 Sub Clock Generator Circuit

The sub clock generator circuit is shown in Figure 5.2. The sub clock oscillates at 32.768 kHz. Capacitors C19 and C20 have a capacitance of 10 pF, while resistor R11 has a resistance of 0 Ω and resistor R12 a resistance of 6.8 MΩ. Components are not mounted on the IC1 side.

If MCU power supply voltage is low, it will take time for sub clock oscillation to stabilize. Be aware of this when changing from the main clock to the sub clock.

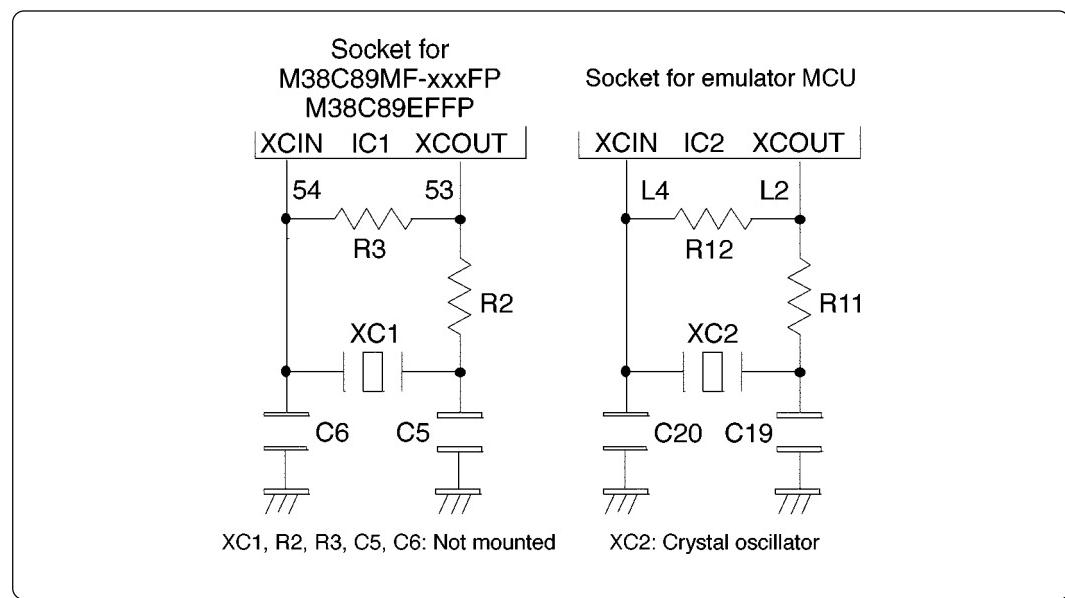


Figure 5.2 Sub clock generator circuit

### 5.3 How to Use the RC Oscillator Circuit

The clock selection circuit is shown in Figure 5.3. Oscillation can be switched between RC oscillation and the oscillator by changing the jumpers. The following procedure explains how to switch to RC oscillation.

- (1) Cut jumper JP4. (When JP4 is cut, the OSCSEL pin becomes high.)
- (2) To enable RC oscillation in IC1, set resistor R1 (see Table 4.3) in jumpers JP1 and JP2 described in Figure 5.1. To enable RC oscillation in IC2, set resistor R10 (see Table 4.1) in jumpers JP5 and JP6 described in Figure 5.1.

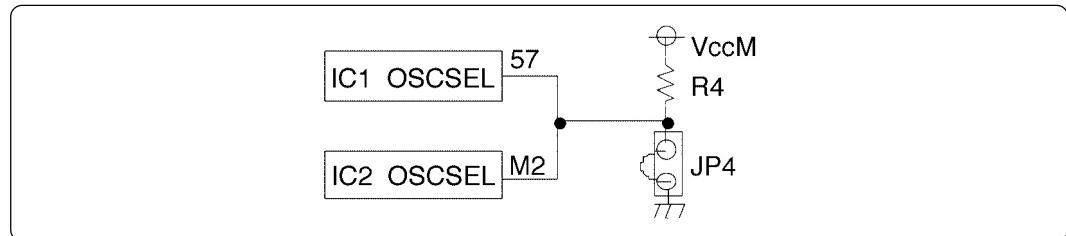


Figure 5.3 Clock selection circuit

## 6. Reset Circuit

Figure 6.1 shows the reset circuit. The reset circuit is common for IC1 and IC2.

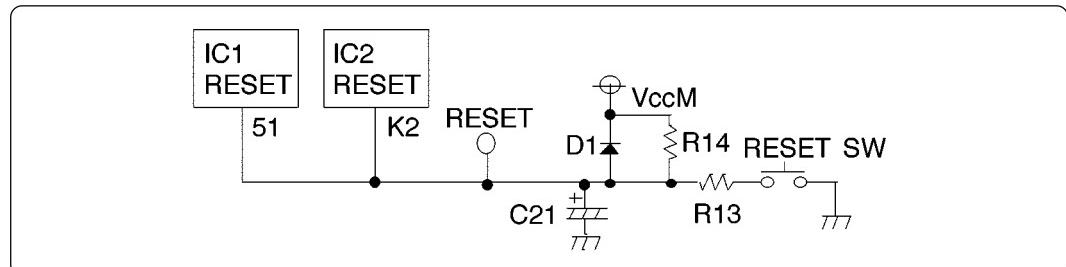


Figure 6.1 Reset circuit

## 7. LCD Bias Circuit

Figure 7.1 shows the LCD bias circuit. The parts are not mounted.

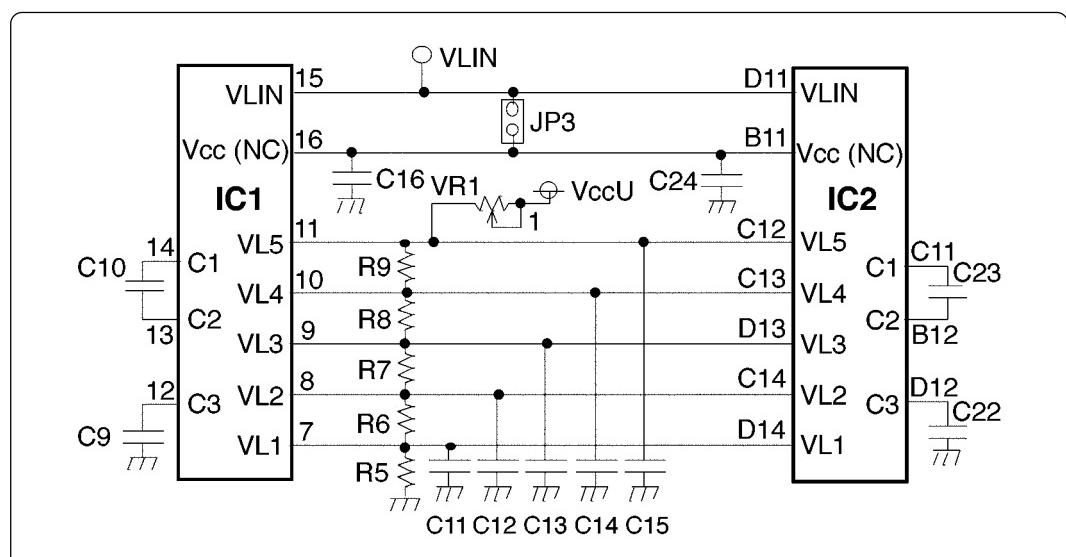


Figure 7.1 LCD bias circuit

## 8. Pin Layout

Table 8.1 lists the pin layout of the connectors.

*Table 8.1 Pin layout of the M38C89T-ADF*

J2			J3			J4					
Signal	Pin No.	Signal	Signal	Pin No.	Signal	Signal	Pin No.	Signal			
VccM	1	2	GND	VccM	1	2	GND	VccM	1	2	GND
SEG0/COM16	3	4	SEG1/COM17	SEG46	3	4	SEG47	P00	3	4	P01
SEG2/COM18	5	6	SEG3/COM19	SEG48	5	6	SEG49	P02	5	6	P03
SEG4/COM20	7	8	SEG5/COM21	SEG50	7	8	SEG51	P04	7	8	P05
SEG6/COM22	9	10	SEG7/COM23	SEG52	9	10	SEG53	P06	9	10	P07
SEG8	11	12	SEG9	SEG54	11	12	SEG55	P10	11	12	P11
SEG10	13	14	SEG11	SEG56	13	14	SEG57	P12	13	14	P13
SEG12	15	16	SEG13	SEG58	15	16	SEG59	P14	15	16	P15
SEG14	17	18	SEG15	SEG60/COM31	17	18	SEG61/COM30	P16	17	18	P17
SEG16	19	20	SEG17	SEG62/COM29	19	20	SEG63/COM28	P20	19	20	P21
SEG18	21	22	SEG19	SEG64/COM27	21	22	SEG65/COM26	P22	21	22	P23
SEG20	23	24	SEG21	SEG66/COM25	23	24	SEG67/COM24	P24	23	24	P25
SEG22	25	26	SEG23	COM0	25	26	COM1	P26	25	26	P27
SEG24	27	28	SEG25	COM2	27	28	COM3	P30	27	28	P31
SEG26	29	30	SEG27	COM4	29	30	COM5	P32	29	30	P33
SEG28	31	32	SEG29	COM6	31	32	COM7	P40	31	32	P41
SEG30	33	34	SEG31	COM8	33	34	COM9	P42	33	34	P43
SEG32	35	36	SEG33	COM10	35	36	COM11	P44	35	36	P45
SEG34	37	38	SEG35	COM12	37	38	COM13	P46	37	38	P47
SEG36	39	40	SEG37	COM14	39	40	COM15	NC	39	40	NC
SEG38	41	42	SEG39	NC	41	42	NC	NC	41	42	NC
SEG40	43	44	SEG41	NC	43	44	NC	NC	43	44	NC
SEG42	45	46	SEG43	NC	45	46	NC	NC	45	46	NC
SEG44	47	48	SEG45	NC	47	48	NC	NC	47	48	NC
GND	49	50	VccU	GND	49	50	VccU	GND	49	50	VccU

# **MEMO**

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